REMARKS

Claims 1-27 are pending; claims 17-27 are newly submitted with this response; claims 14-16 stand withdrawn; claim 13 is allowed.

Claim Rejections - 35 U.S.C. § 103:

Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugawara et al. (U.S. Patent No. 5,527,581) in view of Bagrodia et al. (U.S. Patent No. 6,337,046) and Tsipursky et al. (U.S. Patent No. 5,849,830) or Li et al. (U.S. Patent No. 6,060,549).

Applicant respectfully traverses the rejection of claim 1 over Sugawara et al. in view of Bagrodia et al. and Tsipursky et al. or Li et al. As was discussed in more detail in the response of June 15, 2004, Sugawara et al. discloses a car interior member and a method of molding the same. The interior member is a multi-layer construction and the multiple layers are simultaneously molded using a conventional multi-layer blow molding process. The main structure or base layer of these multiple layers may be reinforced with conventional filler materials, such as inorganic filler (talc, mica, calcium carbonate, and others), glass fiber, or rubber. Such conventional larger filler particles can act as stress concentrators and initiate tears in the parison. As a result, Sugawara et al. disclose a multi-layer blow molding process wherein the conventional filler material may only be added to the base layer.

The present invention provides a method for blow molding large parts by blow molding a single layer of a reinforced plastic melt comprising at least one thermoplastic material and reinforcement particles dispersed therein. The use of nanoparticles obviates the use of the multi-layer approach as disclosed by Sugawara et al. In accordance with the present invention, a single layer containing the nanoparticles is blow molded. Thus, in accordance with the present invention, the blow molding process is a simpler, easier, and more economical process than the one disclosed by Sugawara et al. When compared to conventional large plastic parts, the resulting blow molded part in accordance with the invention has a higher modulus of elasticity and can thus be manufactured with a reduced wall thickness while maintaining the same required impact resistance.

Furthermore, as discussed in more detail in the response of June 15, 2004, Bagrodia et al. disclose a process for producing containers for food and beverages from molded polyester compositions. An advantage of the disclosed process by Bagrodia et al. is the provision of containers with improved barrier and visual properties. However, Bagrodia et al. make no mention or understanding of the ability to significantly enhance the physical and/or mechanical properties of the base resin. Bagrodia et al. do not contemplate the possibility of providing large, structural parts through blow molding of a plastic material being reinforced with nanoparticles. Thus, the Bagrodia et al. reference does not contemplate structural materials.

The present invention discloses a blow molding method and apparatus for producing large, structural, reinforced plastic parts as opposed to relatively small containers for food and beverages as disclosed in Bagrodia et al. The use of nanoparticles in the plastic melt yields a part with a higher modulus of elasticity while maintaining the same required impact resistance.

Tsipursky et al. discloses intercalated layered materials, and exfoliates thereof, manufactured by sorption of one or more oligomers or polymers between planar layers of a swellable layered material, such as a phyllosilicate or other layered material, to expand the interlayer spacing of adjacent layers. Nanocomposite materials are manufactured by combining a host material, such as an organic solvent or a matrix polymer and intercalates and exfoliated intercalates are formed with N-alkenyl amides and/or acrylate-functional pyrrolidone and allylic monomers, oligomers and copolymers. Tsipursky et al. make brief mention for the use of such composite materials as external body parts for the automotive industry; heat-resistant polymeric automotive parts in contact with an engine block; tire cord for radial tires; food wrap having improved gas impermeability; electrical components; food grade drink containers; and any other use where it is desired to alter one or more physical properties of a matrix polymer, such as elasticity and temperature characteristics, e.g., glass transition temperature and high temperature resistance. However, Tsipursky et al. do not provide any disclosure of blow molding large, reinforced plastic parts. Tsipursky et al. disclose molding compositions for the production of sheets and panels. (col. 24, lines 38-57) Such sheets and panels may be shaped by conventional processes such as vacuum processing or by hot pressing. Furthermore, the composite materials disclosed by Tsipursky et al. are especially useful for fabrication of extruded

films and film laminates, as for example, films for use in food packaging. Such films can be fabricated using conventional film extrusion techniques. (col. 24, lines 58-65).

Li et al. discloses toughened nanocomposite materials that are prepared based on a blend of one or more thermoplastic engineering resins. These nanocomposite materials exhibit improved mechanical properties and impact strength.

However, the present invention discloses a reinforced plastic melt comprising at least one thermoplastic material, such as a thermoplastic olefin (TPO) and/or thermoplastic polyolefin elastomer (TPE), and reinforcement particles dispersed within the at least one thermoplastic material. These materials are different from engineering plastics. Engineering plastics are typically used as a replacement for traditional materials, such as metal or wood, in structural applications. In accordance with the present invention, TPO and TPE materials are reinforced with layered mineral particles to achieve similar properties as with engineering plastics without incurring the expense of engineering plastics. The reinforced, blow molded large parts in accordance with the instant invention have several advantages over parts prepared from engineering plastics. First, as discussed above, the blow molded large parts in accordance with the invention are less expensive than parts prepared from engineering resins. Furthermore, the blow molded large parts in accordance with the instant invention have a lower specific gravity than parts prepared from engineering resins would have. For example, parts in accordance with the invention typically have a specific gravity of 0.95 to 1.0 g/cm^3, and parts prepared from engineering resins typically would have a specific gravity of 1.2 to 1.3 g/cm^3. The lower specific gravity of parts in accordance with the instant invention provides for lighter weight parts with equivalent performance as parts prepared from engineering plastics. Furthermore, as a result of the lower specific gravity of the parts in accordance with the instant invention, a faster molding cycle can be achieved since lower molding temperatures are required when compared to parts made from engineering resins. As a result, in accordance with the instant invention less energy is used in the manufacturing process. Thus, the present invention provides several advantages over the prior art.

In view of the arguments presented above, Applicant submits that Sugawara et al. in view of Bagrodia et al. and Tsipursky et al. or Li et al. do not render claim 1 obvious. Sugawara et al. discloses a conventional multi-layer blow molding process using conventional reinforcement materials and absent any nanoparticles. Bagrodia et

al. are concerned with the improvement of visual and barrier properties of relatively small containers for food and beverages by adding platelet particles. Bagrodia et al. do not contemplate the provision of structural materials. Tsipursky et al. do not provide any disclosure of blow molding large, reinforced plastic parts. They disclose molding compositions for the production of sheets and panels shaped by conventional processes, such as vacuum processing or by hot pressing. Furthermore, the composite materials disclosed by Tsipursky et al. are especially useful for fabrication of extruded films and film laminates, such as films for use in food packaging. Li et al. disclose the use of toughened nanocomposites based on a blend of one or more engineering resins. They do not disclose or suggest the use TPO and TPE for blow molding large, reinforced plastic parts as disclosed in accordance with the instant invention.

"To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)" [MPEP § 2142; 8th Edition, Rev. 1, Feb. 2003, Pg. 2100-124].

Neither Sugawara et al., nor Bagrodia et al., nor Tsipursky et al., nor Li et al. suggest in some way a modification or combination with each other in order to arrive at the claimed invention. It is submitted that a combination of Sugawara et al., Bagrodia et al., and Tsipursky et al. or Li et al. is improperly using Applicant's teaching to hunt through the prior art for the claimed elements and combine them as claimed. The cited references provide no technological motivation for engaging in the modification or change. The instant invention provides a process for blow molding large, structural parts with novel properties as discussed above. These novel properties are unexpected from the prior art references.

Therefore, Applicant respectfully submits that claim 1 is allowable and withdrawal of the rejection is respectfully requested.

Claims 2-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugawara et al./Bagrodia et al./Tsipursky et al./Li et al. as applied to claim 1 and further in view of Noba et al. (JP 410244889).

Claims 2-7 ultimately depend from claim 1 and are likewise submitted to be allowable for at least the reason above. Withdrawal of the rejection is respectfully requested.

Claims 8-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugawara et al./Bagrodia et al./Tsipursky et al./Li et al. as applied to claim 1 and further in view of Petrelli (U.S. Patent No. 5,000,333) and Plant (U.S. Patent No. 5,649,587).

Claims 8-12 ultimately depend from claim 1 and are likewise submitted to be allowable for at least the reason above. Withdrawal of the rejection is respectfully requested.

Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. (U.S. Patent No. 6,060,549).

Applicant respectfully traverses the rejection of claim 1 over Li et al. A detailed discussion of Li et al. is provided above. Thus, as was stated heretofore, Li et al. disclose the use of toughened nanocomposites based on a blend of one or more engineering resins. They do not disclose or suggest the use TPO and TPE for blow molding large, reinforced plastic parts as disclosed in accordance with the instant invention.

Thus, Applicant respectfully submits that claim 1 is allowable and withdrawal of the rejection is respectfully requested.

Claims 2-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. in view of Noba et al.

Claims 2-7 ultimately depend from claim 1 and are likewise submitted to be allowable for at least the reason above. Withdrawal of the rejection is respectfully requested.

Claims 8-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. in view of Petrelli and Plant.

Claims 8-12 ultimately depend from claim 1 and are likewise submitted to be allowable for at least the reason above. Withdrawal of the rejection is respectfully requested.

Furthermore, new claims 17 to 27 are submitted with this response. No new subject matter is included in these claims. Independent claim 17 includes the limitations of previous claims 1 and 2 and independent claim 23 includes the limitations of previous claims 1 and 8.

Applicant submits that the Application is now in condition for Allowance, and a holding to this effect is respectfully solicited. If however, the Examiner believes that any issue remains, he is requested to call Applicant's undersigned attorney of record so that a brief interview may be arranged for resolving any such remaining issue.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any overpayments to the above-referenced Deposit Account.

Respectfully submitted,
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